www.oilreview.me

UK £10, USA $16.50

# Oil Review Middle East

Oil · Gas · Petrochemicals

VOLUME 22 | ISSUE 3 2019

## Middle East oil companies expand global petrochemicals footprint

- Redefining resilience in the oil and gas industry
- Challenges and opportunities in Kuwait
- The latest in valve technology
- Is AI the key to growth for energy companies?
- Geochemistry moves to the wellsite
- Automating seismic data acquisition



22 Years

Serving the regional oil & gas sector since 1997

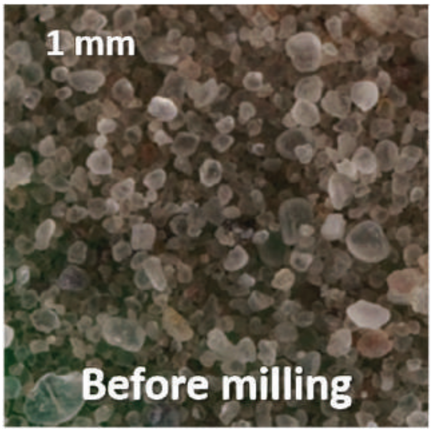
# Geochemistry moves to the **wellsite**

Surface logging services provider GEOLOG describes a new method of H2S mapping in reservoirs.

ACID GAS CONTAMINATION of hydrocarbon resources is a growing issue, an increasing number of new discoveries being affected by the presence of non-hydrocarbon gases. Although today very sour hydrocarbons may be economically produced, the cost involved can heavily affect profitability. H2S is one of the most frequent contaminant gasses occurring in reservoirs, and its distribution mapping can greatly help in optimising completion and, more importantly, in reducing development costs.

Detection of H2S is no easy task: as an acid gas it readily dissolves in alkaline water-based mud, but it is also removed by scavengers purposely added to any type of mud to prevent the uncontrolled release of H2S at surface. Inorganic scavengers (zinc and iron complexes), have a long history of use and will easily release H2S captured in the well after acid treatment. These are now being replaced by organic scavengers, such as triazine, which have an irreversible reaction with H2S. Existing methods of detecting H2S as free gas, and via acid decomposition of sulfides formed with inorganic scavengers, will not work with organic scavengers and as such, detection of H2S distribution along the well profile is becoming increasingly problematic.

A new method based on detecting H2S within the pore structure of cuttings has been successfully tested and applied. The concept behind this method is that gases contained within the rock's pore network are not fully released from cuttings at surface and that a residual part of them can be freed and detected if the cuttings are ground in a sealed vessel, destroying the rock and pores.



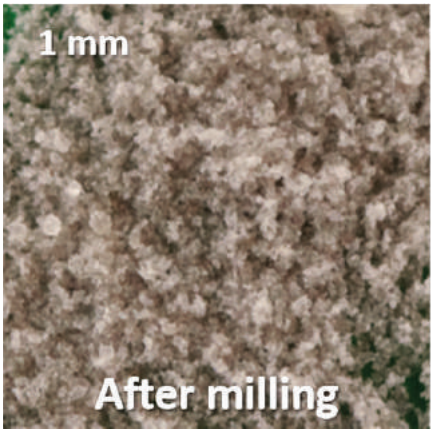




Image Credit : GEOLOG

*Cuttings before milling, still containing H2S, and after milling.*

> "Detection of H2S distribution along the well profile is becoming increasingly problematic."

The methodology is quite simple: cuttings are placed in a sealed container and ground to a defined size. The gas released by pore destruction and trapped within the container is swept from the container by a carrier gas and introduced into a micro GC with TCD detector for analysis. Analytical GC turnaround time is 90 seconds and the full process (sample preparation, grinding and GC analysis) takes 15 minutes when performed at the well site. The permeability of the cuttings samples plays a key role in preservation of H2S within the cuttings, however acquired experience shows that only in the case of very high permeability rocks is gas is not preserved at all.

To validate the results, natural hydrocarbon gas (C1-C5) analysis is performed in a similar way, the presence of this natural gas confirming the existence of pores with residual gas and further validating the reliability of H2S mapping. The measured abundance of H2S can be considered as a relative indication, obviously affected by permeability values, however these data can be usefully used to map H2S occurrence in the reservoir. ■

Image Credit : Alexey Filatov/Adobe Stock

*H2S is prevalent in Middle East reservoirs.*